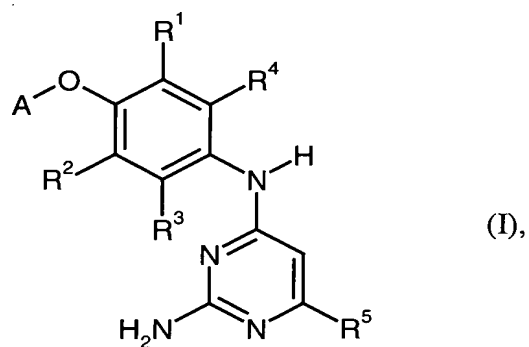


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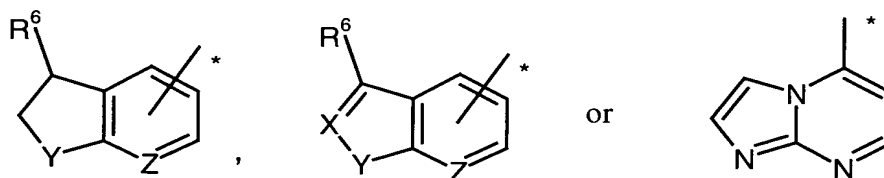
Claims

1. A compound of the formula



in which

A represents a radical



in which

X represents N or C-H,

Y represents N-R⁷, O or S

in which

R⁷ represents hydrogen, benzyl, phenyl, (C₁-C₆)-alkyl or (C₃-C₈)-cycloalkyl,

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where alkyl and cycloalkyl for their part may be substituted by fluorine, hydroxyl, amino, carboxyl, (C₁-C₆)-alkoxy, (C₁-C₆)-alkylamino or morpholinyl,

5

Z represents N or C-H,

R⁶ represents hydrogen, halogen, trifluoromethyl, (C₁-C₆)-alkylamino or W-R⁷,

10

in which

W represents NH, O or a bond,

15

R⁷ is as defined above

and

* denotes the point of attachment to the phenolic oxygen,

20

R¹ and R² independently of one another represent hydrogen, halogen or cyano,

R³ and R⁴ independently of one another represent hydrogen, fluorine or chlorine,

25

R⁵ represents a radical selected from the group consisting of:

hydrogen, hydroxyl, halogen, trifluoromethyl,

30

(C₃-C₈)-cycloalkyl, (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy,

- 180 -

where cycloalkyl, alkyl and alkoxy for their part may be substituted by hydroxyl, carboxyl, (C₁-C₆)-alkoxy, (C₁-C₆)-alkoxycarbonyl, (C₆-C₁₀)-aryl, NR⁸R⁹ or C(=O)NR⁸R⁹,

5

in which

R⁸ and R⁹ independently of one another represent hydrogen, (C₁-C₈)-alkyl, optionally (C₁-C₆)-alkyl-substituted (C₃-C₆)-cycloalkyl, optionally halogen-substituted (C₆-C₁₀)-aryl or 5- to 10-membered heteroaryl

10

or

15

R⁸ and R⁹ together with the nitrogen atom to which they are attached form a 5- or 6-membered heterocycle which may contain a further heteroatom O or N in the ring and which may be substituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkanoyl or (C₁-C₆)-alkoxycarbonyl,

20

(C₆-C₁₀)-aryl, (C₆-C₁₀)-aryloxy, 5- to 10-membered heteroaryl, 5- to 10-membered heteroaryloxy, 5- to 10-membered heterocyclyl which is attached via a carbon atom,

25

where aryl, aryloxy, heteroaryl, heteroaryloxy and heterocyclyl for their part may be substituted by halogen, cyano, nitro, carboxyl, amino, trifluoromethyl, optionally hydroxyl-substituted (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, (C₁-C₆)-alkylamino,

30

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(C₁-C₆)-alkanoyl, (C₁-C₆)-alkoxycarbonyl, (C₁-C₆)-
alkanoylamino, (C₁-C₆)-alkoxycarbonylamino or 5- or 6-
membered heterocyclyl,

5 NR¹⁰R¹¹

in which

10 R¹⁰ and R¹¹ independently of one another represent hydrogen,
(C₁-C₆)-alkyl, (C₃-C₈)-cycloalkyl, (C₆-C₁₀)-aryl or 5- to
10-membered heteroaryl,

15 where alkyl and cycloalkyl for their part may be
substituted by hydroxyl, (C₁-C₆)-alkoxy, (C₆-C₁₀)-aryl,
5- to 10-membered heteroaryl or NR¹⁵R¹⁶,

in which

20 R¹⁵ and R¹⁶ independently of one another represent
hydrogen, (C₁-C₆)-alkyl, (C₃-C₆)-cycloalkyl,
(C₆-C₁₀)-aryl or 5- or 6-membered heteroaryl

or

25 R¹⁵ and R¹⁶ together with the nitrogen atom to which
they are attached form a 5- or 6-membered
heterocycle which may contain a further
heteroatom O or N in the ring and which may be
30 substituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkanoyl or
(C₁-C₆)-alkoxycarbonyl,

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and

aryl and heteroaryl for their part may be substituted by
halogen, hydroxyl, amino, cyano, trifluoromethyl, (C₁-
C₆)-alkyl, (C₁-C₆)-alkoxy, (C₁-C₆)-alkylamino or
(C₁-C₆)-alkanoylamino,

or

R¹⁰ and R¹¹ together with the nitrogen atom to which they are
attached form a 4- to 6-membered heterocycle which
may contain a further heteroatom O or N in the ring and
which may be substituted by fluorine, hydroxyl,
carboxyl, 5- to 7-membered heterocyclyl which may
contain one or two further heteroatoms N and/or O in
the ring and which for its part may be substituted by
(C₁-C₄)-alkyl or (C₁-C₄)-alkoxycarbonyl, (C₁-C₄)-
alkoxy, optionally hydroxyl-, (C₁-C₄)-alkoxy- or
NR¹⁷R¹⁸-substituted (C₁-C₄)-alkyl, (C₁-C₄)-alkanoyl,
(C₁-C₄)-alkoxycarbonyl or NR¹²R¹³,

where

R¹² and R¹³ independently of one another represent
hydrogen, (C₁-C₆)-alkyl, (C₁-C₄)-
alkoxycarbonyl, (C₃-C₈)-cycloalkyl or (C₁-C₄)-
alkanoyl

or

- 183 -

5 R¹² and R¹³ together with the nitrogen atom to which
 they are attached form a 5- or 6-membered
 heterocycle which may contain a further
 heteroatom O or N in the ring and which may be
 substituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkanoyl or
 (C₁-C₆)-alkoxycarbonyl,

and

10 R¹⁷ and R¹⁸ independently of one another represent
 hydrogen, optionally hydroxyl-substituted (C₁-
 C₆)-alkyl, (C₃-C₆)-cycloalkyl, (C₆-C₁₀)-aryl or 5-
 or 6-membered heteroaryl

15 or

 R¹⁷ and R¹⁸ together with the nitrogen atom to which
 they are attached form a 5- or 6-membered
 heterocycle which may contain a further
20 heteroatom O or N in the ring and which may be
 substituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkanoyl or
 (C₁-C₆)-alkoxycarbonyl,

or

25 R¹⁰ and R¹¹ together with the nitrogen atom to which they are
 attached form a 7- to 12-membered bicyclic or tricyclic
 heterocycle which is fused or spirocyclic and which
 may have one or two further heteroatoms from the
30 group consisting of N and O in the ring and which may

- 184 -

be substituted by fluorine, (C₁-C₄)-alkyl, (C₁-C₄)-alkoxycarbonyl, (C₁-C₄)-alkanoyl or benzyl,

and C(=O)R¹⁴,

5

in which

10

R¹⁴ represents (C₁-C₆)-alkoxy, (C₁-C₆)-alkylamino or a 5- to 10-membered mono- or bicyclic heterocycle which is attached via a nitrogen atom, which is fused or spirocyclic and which may have one or two further heteroatoms from the group consisting of N and O in the ring,

15

where alkylamino for its part may be substituted by a 5- or 6-membered heterocycle,

or a salt, a hydrate, a hydrate of a salt or a solvate thereof.

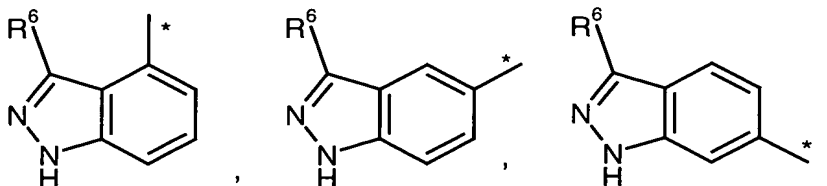
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2. The compound as claimed in claim 1

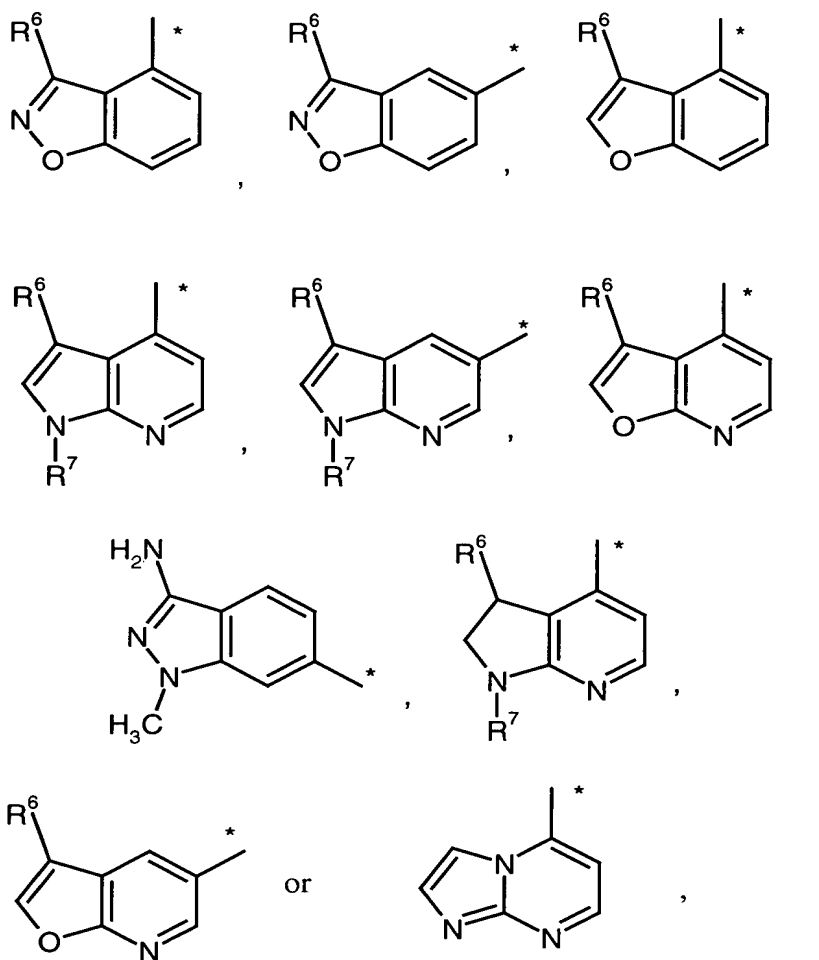
in which

25

A represents a radical



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in which

R^6 represents hydrogen, (C_1-C_4) -alkyl or $NH-R^7$,

10 R^7 represents hydrogen or (C_1-C_4) -alkyl

and

* denotes the point of attachment to the phenolic oxygen,

15

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R^1 and R^2 independently of one another represent hydrogen, fluorine or chlorine,

R^3 and R^4 independently of one another represent hydrogen or fluorine,

5

R^5 represents a radical selected from the group consisting of:

hydrogen, chlorine, (C₃-C₈)-cycloalkyl, (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy,

10

where alkyl and alkoxy for their part may be substituted by hydroxyl, carboxyl, (C₁-C₄)-alkoxy, (C₁-C₄)-alkoxycarbonyl, NR⁸R⁹ or C(=O)NR⁸R⁹,

in which

15

R^8 and R^9 independently of one another represent hydrogen, (C₁-C₈)-alkyl, optionally (C₁-C₄)-alkyl-substituted (C₃-C₆)-cycloalkyl, optionally halogen-substituted phenyl or 5- or 6-membered heteroaryl

20

or

R^8 and R^9 together with the nitrogen atom to which they are attached form a morpholine, piperazine, piperidine or pyrrolidine ring, where the rings for their part may be substituted by (C₁-C₄)-alkyl,

25

- 187 -

(C₆-C₁₀)-aryl, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl which is attached via a carbon atom,

where aryl, heteroaryl and heterocyclyl for their part may be substituted by halogen, cyano, nitro, carboxyl, amino, trifluoromethyl, optionally hydroxyl-substituted (C₁-C₄)-alkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-alkylamino, (C₁-C₄)-alkanoyl, (C₁-C₄)-alkoxycarbonyl, (C₁-C₄)-alkanoylamino, (C₁-C₄)-alkoxycarbonylamino or 6-membered heterocyclyl,

NR¹⁰R¹¹

in which

R¹⁰ and R¹¹ independently of one another represent hydrogen, (C₁-C₆)-alkyl, (C₃-C₈)-cycloalkyl, phenyl or 5- or 6-membered heteroaryl,

where alkyl and cycloalkyl for their part may be substituted by hydroxyl, (C₁-C₄)-alkoxy, phenyl, 5- or 6-membered heteroaryl or NR¹⁵R¹⁶,

in which

R¹⁵ and R¹⁶ independently of one another represent hydrogen, (C₁-C₄)-alkyl, (C₃-C₆)-cycloalkyl, phenyl or 5- or 6-membered heteroaryl

or

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R¹⁵ and R¹⁶ together with the nitrogen atom to which they are attached form a morpholine, piperazine, piperidine or pyrrolidine ring, where the rings for their part may be substituted by (C₁-C₄)-alkyl,

and

phenyl and heteroaryl for their part may be substituted
by fluorine, chlorine, hydroxyl, amino, cyano,
trifluoromethyl, (C₁-C₄)-alkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-
alkylamino or (C₁-C₄)-alkanoylamino,

15 or

R¹⁰ and R¹¹ together with the nitrogen atom to which they are attached form a 4- to 6-membered heterocycle which may contain a further heteroatom O or N in the ring and which may be substituted by fluorine, hydroxyl, carboxyl, 5- to 7-membered heterocyclyl which may contain one or two further heteroatoms N and/or O in the ring and which for its part may be substituted by (C₁-C₄)-alkyl or (C₁-C₄)-alkoxycarbonyl, (C₁-C₄)-alkoxy, optionally hydroxyl-, (C₁-C₄)-alkoxy- or NR¹⁷R¹⁸-substituted (C₁-C₄)-alkyl, (C₁-C₄)-alkanoyl, (C₁-C₄)-alkoxycarbonyl or NR¹²R¹³,

where

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R^{12} and R^{13} independently of one another represent hydrogen or (C₁-C₄)-alkyl

or

5

R^{12} and R^{13} together with the nitrogen atom to which they are attached form a 5- or 6-membered heterocycle which may contain a further heteroatom O or N in the ring and which may be substituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkanoyl or (C₁-C₆)-alkoxycarbonyl,

10

and

15

R^{17} and R^{18} independently of one another represent hydrogen, optionally hydroxyl-substituted (C₁-C₄)-alkyl or phenyl

or

20

R^{17} and R^{18} together with the nitrogen atom to which they are attached form a pyrrolidine ring,

or

25

R^{10} and R^{11} together with the nitrogen atom to which they are attached form a 7- to 12-membered bicyclic or tricyclic heterocycle which is fused or spirocyclic, which may have one or two further heteroatoms from the group consisting of N and O in the ring and which may be

30

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substituted by (C₁-C₄)-alkyl, (C₁-C₄)-alkoxycarbonyl,
(C₁-C₄)-alkanoyl or benzyl,

and C(=O)R¹⁴

5

in which

10

R¹⁴ represents (C₁-C₆)-alkoxy, (C₁-C₆)-alkylamino or a 5-
to 10-membered mono- or bicyclic heterocycle which is
attached via a nitrogen atom, which is fused or
spirocyclic and which may have one or two further
heteroatoms from the group consisting of N and O in
the ring,

15

where alkylamino for its part may be substituted by a 5-
or 6-membered heterocyclyl,

or a salt, a hydrate, a hydrate of a salt or a solvate thereof.

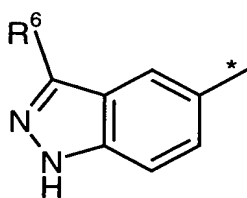
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3. The compound as claimed in claim 1 or 2

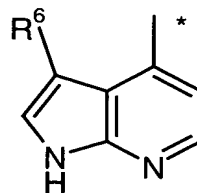
in which

A represents a radical

25



or



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in which

R^6 represents hydrogen or methyl

5 and

* denotes the point of attachment to the phenolic oxygen,

10 R^1 and R^2 independently of one another represent hydrogen, fluorine or chlorine,

R^3 and R^4 represent hydrogen,

15 R^5 represents a radical selected from the group consisting of:

hydrogen, chlorine, cyclohexyl, (C₁-C₄)-alkyl, (C₁-C₄)-alkoxy,

20 where alkyl and alkoxy for their part may be substituted by hydroxyl, carboxyl, (C₁-C₄)-alkoxy, methyloxycarbonyl, ethyloxycarbonyl, NR⁸R⁹ or C(=O)NR⁸R⁹,

in which

25 R^8 and R^9 independently of one another represent hydrogen, (C₁-C₈)-alkyl, cyclopropyl, optionally methyl-substituted cyclopentyl or optionally fluorine-substituted phenyl

or

30

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R^8 and R^9 together with the nitrogen atom to which they are attached form a piperidine, 2-methylpiperidine or 2,6-dimethylpiperidine ring,

5 phenyl, pyridyl, pyrrolyl, piperidin-3-yl, piperidin-4-yl, pyrrolidin-2-yl,

where phenyl, pyridyl and pyrrolyl for their part may be substituted by fluorine, chlorine, bromine, cyano, nitro, trifluoromethyl, methyl, hydroxymethyl, methoxy, 10 dimethylamino or morpholinyl,

and

15 piperidin-3-yl, piperidin-4-yl and pyrrolidin-2-yl for their part may be substituted by methyl, ethyl, n-propyl, isopropyl, methylcarbonyl or ethylcarbonyl,

$NR^{10}R^{11}$

20

in which

R^{10} and R^{11} independently of one another represent hydrogen, (C₁-C₄)-alkyl, 3-hydroxypropyl, 2-hydroxycyclohexyl, 2-aminocyclohexyl, phenyl, pyridyl or pyrazolyl, 25

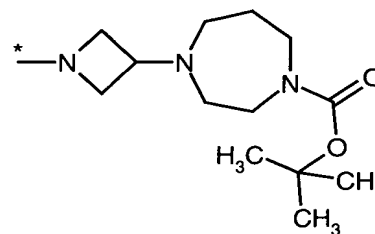
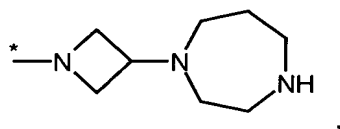
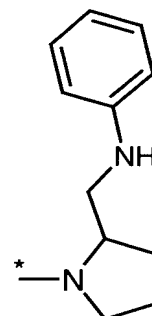
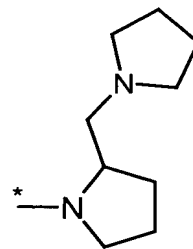
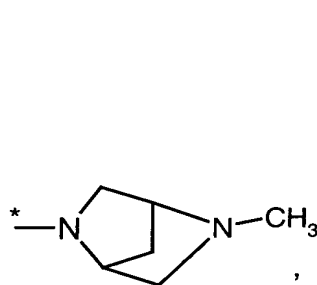
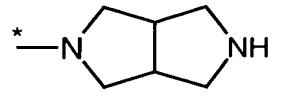
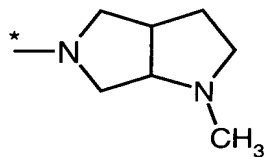
where phenyl and pyridyl for their part may be substituted by chlorine, hydroxyl, amino, cyano, methyl or methoxy,

30

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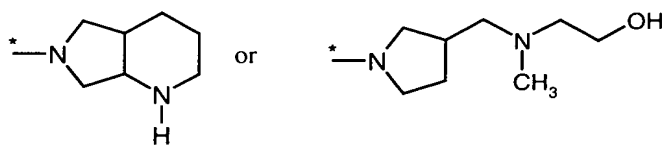
or

R^{10} and R^{11} together with the nitrogen atom to which they are
 attached form a piperazine, 3-methylpiperazine, 3,5-
 dimethylpiperazine, 4-isobutylpiperazine, morpholine,
 pyrrolidine, 3-aminopyrrolidine, 3-methylamino-
 pyrrolidine, 3-(*N,N*-dimethylamino)pyrrolidine,
 2-aminomethylpyrrolidine, 3-hydroxypyrrolidine,
 2-hydroxymethylpyrrolidine or 2-methoxymethyl-
 pyrrolidine ring or a radical



15

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in which

5 * denotes the point of attachment to the pyrimidine ring,

and C(=O)R¹⁴

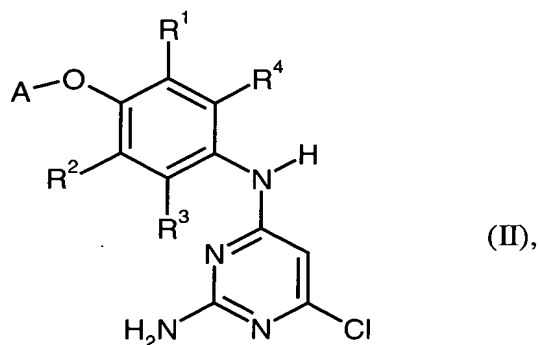
10 in which

R¹⁴ represents methoxy, piperidinyl-N-ethylamino, piperidinyl or piperazinyl,

15 or a salt, a hydrate, a hydrate of a salt or a solvate thereof.

4. A process for preparing compounds as defined in claim 1, characterized in that either

20 [A] compounds of the formula (II)



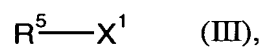
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in which

A, R¹, R², R³ and R⁴ are as defined in claim 1

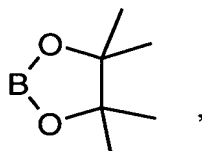
5

are reacted with compounds of the formula (III)



in which

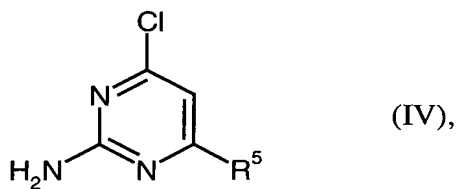
10

R⁵ is as defined in claim 1 andX¹ represents hydrogen, B(OH)₂ or a boronic acid ester such as

15

or

[B] compounds of the formula (IV)



(IV),

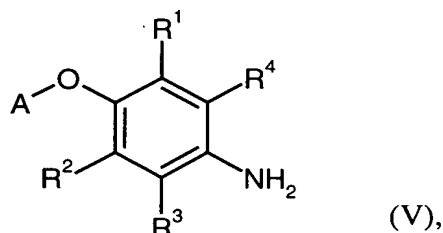
20

in which

R⁵ is as defined in claim 1

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are reacted with compounds of the formula (V)



(V),

5 in which

A , R^1 , R^2 , R^3 and R^4 are as defined in claim 1.

- 10 5. The compound as defined in any of claims 1 to 3 for the treatment and/or prophylaxis of disorders.
6. The use of a compound as defined in any of claims 1 to 3 for preparing medicaments for the treatment and/or prophylaxis of cardiovascular disorders.
- 15 7. The use of a compound as defined in any of claims 1 to 3 for preparing medicaments for the treatment and/or prophylaxis of erectile dysfunction.
8. A method for the treatment and/or prophylaxis of cardiovascular disorders wherein a cardiovascularly effective amount of a compound as defined in any of claims 1 to 3 is used.
- 20 9. A medicament, comprising a compound as defined in any of claims 1 to 3 and a further active compound.
- 25 10. A medicament comprising a compound as defined in any of claims 1 to 3 in combination with an inert nontoxic pharmaceutically acceptable auxiliary.